Cvičenia

1. Určte obor definície daných funkcií

$$f_1(x)=\frac{5x-2}{x^2-5x+6}+\sqrt[5]{2x+7}\,, \qquad \{x\neq 2, x\neq 3\}$$

$$f_2(x)=\arccos\frac{1-2x}{3}+5\sin(x-5)\,, \qquad \{\langle -1,2\rangle\}$$

$$f_3(x)=\ln(x^2-16)+\cos(x^2-16)\,, \qquad \{|x|>4\}$$

$$f_4(x)=\arcsin\frac{3x-2}{5}+\sqrt{5-3x}+\frac{1-x^2}{1+x^2}\,, \qquad \{\langle -1,5/3\rangle\}$$

$$f_5(x)=\arcsin\frac{x-4}{7}+\frac{\ln(2x-3)}{\sqrt{1-x^2}}\,, \qquad \{(3/2,11\rangle\}$$

$$f_6(x)=\sqrt{\sin x}+\sqrt{9-x^2}\,, \qquad \{\langle 0,3\rangle\}$$

$$f_7(x)=\sqrt{\ln\frac{5x-x^2}{4}}+\sqrt{9+x^2}\,, \qquad \{\langle 1,4\rangle\}$$

$$f_8(x)=\arcsin\frac{x-3}{2}-\ln(4-x)\,, \qquad \{\langle 1,4)\}$$

$$f_9(x)=\sqrt{4x-x^2-3}+\sqrt{9-x^2}\,, \qquad \{\langle 1,3\rangle\}$$

$$f_{10}(x)=\arcsin\frac{1-x}{1+x}+\frac{\ln(2x+3)}{\sqrt{1+x^2}} \qquad \{\langle 0,\infty)\}$$

$$f_{11}(x)=\arccos\frac{2x}{1+x}+5\sin(x^2-5)\,, \qquad \{\langle -1/3,1\rangle\}$$

$$f_{12}(x)=\sqrt{\frac{2x-1}{5+3x}}+\sqrt{16+x^2}\,, \qquad \{(-\infty,-5/3)\cup(1/2,\infty)\}$$

$$f_{13}(x)=\sqrt{\ln\frac{3x-2}{5x+1}}+\sin\sqrt{9+x^2}\,, \qquad \{\langle -3/2,-1/5\}$$

$$f_{14}(x)=\ln\frac{x-5}{x^2-10x+24}-\sqrt[5]{3x+2} \qquad \{(4,5)\cup(6,\infty)\}$$

$$f_{15}(x)=\sqrt{x^2-3x+2}+\frac{2x-5}{\sqrt{x^2-3x+2}} \qquad \{(-\infty,-1)\cup(2,\infty)\}$$

$$f_{16}(x)=\sqrt{\frac{x-2}{2+x}}+\sqrt{\frac{1-x}{1+x}} \qquad \{\emptyset\}$$

2. Zistite, ktorá z daných funkcií je periodická a nájdite jej periódu:

a) $y=\sin(2x/3)$; c) $y=\cos^2 x$; e) $y=x\sin x$;

b) $y=5\cos 2\pi x$; d) $y=\cos x^2$; f) $y=\sin(1/x)$.

$\{a)3\pi; b)1; c)\pi;\quad d), e), f)$ nie sú$\}$

3. Nájdite inverznú funkciu k danej funkcii (alebo k jej zúženiu):

$f_1(x) = \sin(3x-1)$, $\quad |6x-2| < \pi$; $\qquad \left\{ f_1^{-1}(x) = (1+\arcsin x)/3, \langle -1,1 \rangle \right\}$

$f_2(x) = \dfrac{x-1}{2-3x}$; $\qquad \left\{ f_2^{-1}(x) = (2x+1)/(3x+1), (-\infty, 1/3) \cup (-1/3, \infty) \right\}$

$f_3(x) = \begin{cases} x\pi/2 & \text{pre } |\mathrm{x}| \geq 1; \\ \arcsin x & \text{pre } |\mathrm{x}| \leq 1. \end{cases}$ $\qquad \left\{ f_3^{-1}(x) = \begin{cases} 2x/\pi & \text{pre } |\mathrm{x}| \geq \pi/2 \\ \sin x & \text{pre } |\mathrm{x}| \leq \pi/2 \end{cases} \right\}$

$f_4(x) = 3^{x/(x-1)}$; $\qquad \left\{ f_4^{-1}(x) = (\log_3 x)/(\log_3 x - 1), (0,3) \cup (3,\infty) \right\}$

$f_5(x) = 3 + \arccos(2x-1)$; $\qquad \left\{ f_5^{-1}(x) = (1+\cos[(x-3/4)])/2, \langle 3, 3+4\pi \rangle \right\}$

$f_6(x) = \ln(2-3x)$; $\qquad \left\{ f_6^{-1}(x) = (2-e^x)/3, (-\infty, \infty) \right\}$

$f_7(x) = 2^{1+\ln\sqrt{x-2}}$; $\qquad \left\{ f_7^{-1}(x) = 2 + e^{2\log_2(x/2)}, (0,\infty) \right\}$

$f_8(x) = 1 + \sqrt{3+e^{2x}}$; $\qquad \left\{ f_8^{-1}(x) = \ln\sqrt{x^2 - 2x - 2}, (1+\sqrt{3}, \infty) \right\}$

$f_9(x) = 2^{3+\operatorname{arctg} x}$. $\qquad \left\{ f_9^{-1}(x) = \operatorname{tg} \log_2(x/8), (2^{3-\pi/2}, 2^{3+\pi/2}) \right\}$